

REMARKS/ARGUMENT

Applicant responds herein to the Office Action dated May 12, 2004.

Claims 1-29 are currently pending in the present application. Applicants respectfully traverse all claim rejections for the reasons that follow:

I. REJECTIONS OF CLAIMS 1-29 UNDER 35 U.S.C. § 103(a)

Claims 1-29 were rejected under 35 U.S.C. § 103(a) as unpatentable over by U.S. Patent No. 5,178,130 to Kaiya (hereinafter "Kaiya") in view of U.S. Patent No. 4,710, 807 to Chikama (hereinafter "Chikama"). Respectfully, Applicants traverse.

Claim 1 relates to "[a]n endoscopic imaging system comprising . . . a phase adjustment circuit for permitting an operator to manually adjust the phases of the timing signals so as to compensate for a signal delay occurring over a signal transmission line to said imaging device which is linked and over which a signal is transmitted."

At page 7 of the Office Action, it is conceded that "...claim 1 of (sic) Kaiya (U.S. 5,178,130) does not specifically disclose 'permitting an operator to manually adjust the phases...', however, Chikama teaches that the phases can be manually adjusted by an operator via dial or the like (column 7, ln. 38-40).".

Respectfully, adjusting phase differences, whether automatically or manually, is known in a great variety of applications and is not novel standing alone. The instant invention is distinguished by the fact that it is applied to a specific situation, namely to account for cable signals delays in a situation where a single endoscope is made to work with a great variety of endoscope insertion parts. For the reasons that are set forth more fully below, the secondary Chikama reference, which applies phase difference detecting and adjustment technology in an entirely different context, is not applicable to the instant invention.

Kaiya relates to a parent-son type endoscope, in which a secondary endoscope is synchronized with a primary endoscope. (Kaiya, Abstract). As characterized, the parent-and-son type endoscope system 1 of the first embodiment comprises a parent video scope 2a, a son video scope 2b, light source apparatuses 3a and 3b connected respectively to the parent and son video scopes 2a and 2b, camera controllers 4a and 4b to process signals for respective imaging means of the parent and side video scopes 2a and 2b, and monitors 5a and 5b connected to camera controllers

4a and 4b to display endoscope images. The parent camera controller 3a includes a synchronizing circuit 33a which, in conjunction with a son synchronizing circuit 34, generates synchronizing signals to synchronize the timing of the R, G, B sequential lights and to synchronize the SID driving system and signal processing systems. (Kaiya, col. 5, lines 29-38). The main synchronizing circuit 33a includes an oscillator 77 connected to a timing generator 78, which is provided solely as "a **frequency dividing** circuit or the like." (Kaiya, col. 5, lines 62-63). The timing generator 78 performs **a frequency division** of oscillator 77 to produce a vertical synchronizing signal S1 to display the endoscopic images. (Kaiya, col. 5, lines 63-65). Signal S1 is then fed into a **second frequency dividing circuit** 79, which **divides** the frequency of S1 by three to produce synchronizing signal S2. (Kaiya, col. 6, lines 12-15). The S2 signal is then used to properly synchronize light source apparatuses 3a and 3b so that a target object to be imaged is properly illuminated at the correct time. For this purpose, signal S2 is fed into a phase-locked loop (PLL) circuit 82 to control the rotation of a color filter motor 22a, 22b, so that "the rotating **speed and the phase of motor 22a[, 22b]** are controlled . . . to keep the phase of the [color filter motor 22a, 22b] coinciding with the phase of the second synchronizing signal S2." (Kaiya, col. 6, lines 38-52).

Similar to Kaiya, Chikama relates to an illuminating light supply system for an endoscope. (Chikama, Abstract). As characterized, the endoscope include an image pickup element 16 arranged at a distal end of the endoscope. (Chikama, col. 4, lines 4-15). The image pickup element includes a light receiving portion 16a and a memory portion 16b, both portions being located at the distal end. Intermittent light is supplied to a target observation area by rotating a light chopper such that the center of supply time duration of each of the illuminating light pulses is coincident with the corresponding point of time at which the image signals to be offered to the odd field scanning are transferred from the light receiving portion 16a of the image pickup element 16 to the memory portion 16b of the image pickup element 16. (Chikama, col. 6, lines 40-48). To ensure that the illuminating light pulses are coincident with the corresponding point of time at which the image signals to be offered to the odd field scanning are transferred, the phase of rotation of the chopper may be adjusted via a dial or the like. (Chikama, col. 7, lines 10-40).

It is respectfully submitted that the combination of Kaiya and Chikama does not disclose a "phase adjustment circuit for permitting an operator to manually adjust the phases of the timing signals so as to compensate for a signal delay occurring over a signal transmission line to said imaging device which is linked and over which a signal is transmitted," as recited in claim 1. As

described above, the synchronizing circuit of Kaiya is provided solely as a **frequency dividing circuit** (not a phase adjustment circuit) to synchronize various components of the parent-and-son type endoscope system. Specifically, a timing generator 78 of circuit 33a performs **a frequency division** of oscillator 77 to produce signal S1, which is then fed into a **second frequency dividing circuit** 79, which **divides** the frequency of S1 by three to produce synchronizing signal S2. In this manner, it is clear that the synchronizing circuit 33a of Kaiya does not perform any phase adjustment function whatsoever, but rather merely divides a main oscillator clock 77 into S1 and S2 signals having lower frequencies, S1 and S2 being produced without a phase offset. This is further evidenced by the timing diagram of Figure 5, which shows synchronization signals S1, S2 in phase alignment with the oscillator clock signal 77. (Kaiya, Figure 5). As such Kaiya simply does not disclose any mechanism "for adjusting the phases of the timing signals so as to compensate a signal delay occurring over a signal transmission line," as recited in claim 1.

The Office Action disagrees and asserts that the PLL circuit 82 performs such a function. In this regard, Applicants recognize that the PLL circuit 82 is provided to adjust phase. **However, the adjusted phase has absolutely nothing to do with compensating for "a signal delay occurring over a signal transmission line," as recited in claim 1.** As described above, the PLL circuit 82 is provided only to properly synchronize light source apparatuses 3a and 3b so that a target object to be imaged is properly illuminated at the correct time. For this purpose, signal S2 is fed into a phase-locked loop (PLL) circuit 82 to control the rotation of a color filter motor 22a, 22b, so that "the rotating **speed and the phase of motor 22a[, 22b]** are controlled . . . to keep the phase of the [color filter motor 22a, 22b] coinciding with the phase of the second synchronizing signal S2." If Kaiya did not properly phase-lock the motor 22a, 22b, the motor would spin freely on its own and would inevitably drift out of sync with the rest of parent-and-son type endoscope system 1. Thus, Kaiya adjusts motor 22a, 22b to prevent synchronization drift, not to compensate for signal delays occurring over a signal transmission line.

Furthermore, any reading of Chikama makes clear that this reference fails to cure the critical deficiencies of Kaiya as applied against claim 1. As described above, the phase adjustment disclosed in Kaiya relates to the phase adjustment of a light chopper to ensure that the illuminating light pulses are coincident with the corresponding point of time at which the image signals to be offered to the odd field scanning are transferred. As is abundantly clear, this **has absolutely nothing to do with compensating for "a signal delay occurring over a signal transmission line," as recited in**

claim 1. The phase adjustment circuit of Chikama is provided only to synchronize a light source to an image signal transfer. It is not provided to compensate for a signal delay. Furthermore, since the phase adjustment of Chikama is provided solely to synchronize the transfer of image data from the light receiving portion 16a of the image pickup element 16 to the memory portion 16b of the image pickup element 16 (both of which are coupled to one another and located at the distal end of the endoscope), there is simply no "signal transmission line" as recited within the context of claim 1.

For at least the foregoing reasons, it is respectfully submitted that claim 1 is allowable over Kaiya in view of Chikama. Furthermore, since claims 2-17 ultimately depend from claim 1, since claims 18, 22, and 26 also recite "phase adjustment circuit(s) for permitting an operator to manually adjust the phases of the timing signals so as to compensate for a signal delay occurring over a (first and second) signal transmission line(s) to said imaging device which is linked and over which a signal is transmitted," since claims 19-21 ultimately depend from claim 18, since claims 23-25 ultimately depend from claim 22, and since claims 27-29 ultimately depend from claim 26, it is respectfully submitted that these claims are allowable over Kaiya and Chikama for at least the same reasons. Accordingly, it is kindly requested that the rejections of claims 1-29 under 35 U.S.C. § 103(a) be withdrawn.

II. DOUBLE PATENTING REJECTIONS OF CLAIMS 1, 18, 22, AND 26

Claims 1, 18, 22, and 26 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of Kaiya in view of Chikama. Respectfully, Applicants traverse.

As described above, each of claims 1, 18, 22, and 26 recites "phase adjustment circuit(s) for permitting an operator to manually adjust the phases of the timing signals so as to compensate for a signal delay occurring over a (first and second) signal transmission line(s) to said imaging device which is linked and over which a signal is transmitted." Nowhere in claim 1 of Kaiya does a similar feature exist, nor is such a feature obvious over claim 1 of Kaiya in view of Chikama.

The Office Action disagrees. However, as described above, the synchronization of illumination periods has absolutely nothing to do with compensating for "a signal delay occurring over a signal transmission line," as recited in claims 1, 18, 22, and 26. The PLL circuit of Kaiya operates so that "the rotating **speed and the phase of motor 22a[, 22b]** are controlled . . . to keep the phase of the [color filter motor 22a, 22b] coinciding with the phase of the second synchronizing

signal S2." If Kaiya did not perform this function, the motor 22a, 22b would spin freely on its own and would inevitably drift out of sync with the rest of parent-and-son type endoscope system 1. Thus, Kaiya adjusts motor 22a, 22b to prevent synchronization drift, not to compensate for signal delays occurring over a signal transmission line. Similarly, Chikama discloses phase adjustment to ensure that the illuminating light pulses are coincident with the corresponding point of time at which the image signals to be offered to the odd field scanning are transferred. Chikama's phase adjustment simply does not "compensate for a signal delay over a transmission line."

For at least the foregoing reasons, it is respectfully submitted that claims 1, 18, 22, and 26 are not obvious over claim 1 of Kaiya in view of Chikama. Accordingly, it is kindly requested that the rejections of these claims under the judicially created doctrine of obviousness-type double patenting be withdrawn.

III. CONCLUSION

In view of the foregoing, it is respectfully submitted that all pending claims are currently in allowable condition.

Accordingly, the Examiner is respectfully requested to reconsider the application, allow the claims as amended and pass this case to issue.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on July 15, 2004

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